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Evolutionary study of the freshwater sponge genus *Metania* GRAY, 1867: III. Metaniidae, new family

by

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Abstract

The gondwanic genus *Metania* GRAY, 1867 of freshwater sponges is redefined in this, the third paper of a series concerned with a revision of the Neotropical species of this genus. Newly detected characteristica indicate a relationship between *Metania* and the marine genus *Acarnus* GRAY, 1867 of poecilosclerid sponges. Characteristica similar to those in *Metania* were also detected in the genera *Corvomeyenia* WELTNER, 1913, *Acalle* GRAY, 1867 and *Drulia* GRAY, 1867. The genera *Metania, Corvomeyenia, Acalle,* and *Drulia* are transferred from the family Spongillidae GRAY, 1867 into the new family Metaniidae, based upon an initial analysis of their shared characteristics.

Keywords: **Polyphyletism, Poecilosclerid freshwater sponges, resistant characters, genus *Metania*, Metaniidae, new family.**

Resumo

O gênero *Metania* GRAY, 1867, de esponjas de água doce e que tem distribuição gonduânica, é redefinido após a revisão das quatro espécies que o integram na Região Neotropical. Esta revisão trouxe a luz characterísticas que permitem relacionar o gênero *Metania* ao gênero *Acarnus* GRAY, 1867, de esponjas marinhas poecilosclerídas. Características correspondentes as de *Metania* foram percebidas ainda nos gêneros *Corvomeyenia* WELTNER, 1913, *Acalle* GRAY, 1867 e *Drulia* GRAY, 1867. Os quatro gêneros são transferidos da família Spongillidae para a nova família Metaniidae, após uma primeira análise de suas características comuns.

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Introduction

The genus *Metania* GRAY, 1867 shows a typical gondwanic distribution. Two species are registered from the Oriental Region, one from the Ethiopian Region and two from the Neotropical Region (PENNY & RACEK 1968). Quite recently STANISIC (1979) described *Metania ovogemata* from Australia.

An intensive study on a large collection of *Metania* specimens, collected mainly from Amazonian waters, demonstrated that four species are presently registered from the Neotropical Region; *Metania fittkaui* and *Metania subtilis* were described by VOLKMER-RIBEIRO (1979) and two other species, *Metania reticulata* (BOWERBANK, 1863) and *Metania spinata* (CARTER, 1881) were redescribed by VOLKMER-RIBEIRO (1984).

That revision first appeared as a post-doctoral thesis (VOLKMER-RIBEIRO 1976), ending with the suggestion of an *Heteromeyenia/Metania* relationship in the family Spongillidae. STANISIC (1979) presented another hypothesis explaining the origin of the genus *Metania* from a *Radiospongilla* stock. In the present paper these two propositions are reviewed in the light of recent work on the systematics of freshwater sponges. A new phyletic position is proposed for *Metania,* within a new family of sponges.

Distribution of the genus *Metania* in the Neotropical Region

Whilst *M. reticulata* has been recorded from the Brazilian and Venezuelan Amazonia, and *M. spinata* may occur as far south as São Paulo State in Brazil (VOLKMER-RIBEIRO 1984), *M. subtilis* and *M. fittkaui* are only known from Amazonian waters (VOLKMER-RIBEIRO 1979). There is a possibility that the genus *Metania* occurs in the Guaíba River, in the extreme south of Brazil (VOLKMER-RIBEIRO et al. 1975), and also in the São Francisco River, Bahia State, Brazil (LUTZ 1915).

The occurence of *Metania* in the waters of the central part of South America, i. e. the large Parana-Paraguay Rivers basin, has not been recorded.

The Neotropical range of the genus shows a possible discontinuous distribution, with a broad distribution in the Amazon Basin and a presently unconfirmed, restricted distribution in three other areas, south of that basin, at the Brazilian Atlantic border (Fig. 1).

To date, the Neotropical Region supports the largest number (4) of *Metania* species.

The distribution pattern of sponges of the genus *Metania* matches almost perfectly that of the World's Tropical Rain Forests (Fig. 2). All have been collected from bark, branches, twigs or leaves of trees and shrubs which are suspended or subject to prolonged submersion in water.

Fig. 1:
Distribution of the genus *Metania* GRAY, 1867 in the Neotropical Region. Dotted outline, areas of reported occurrences, broken line outline, areas of expected occurrence.

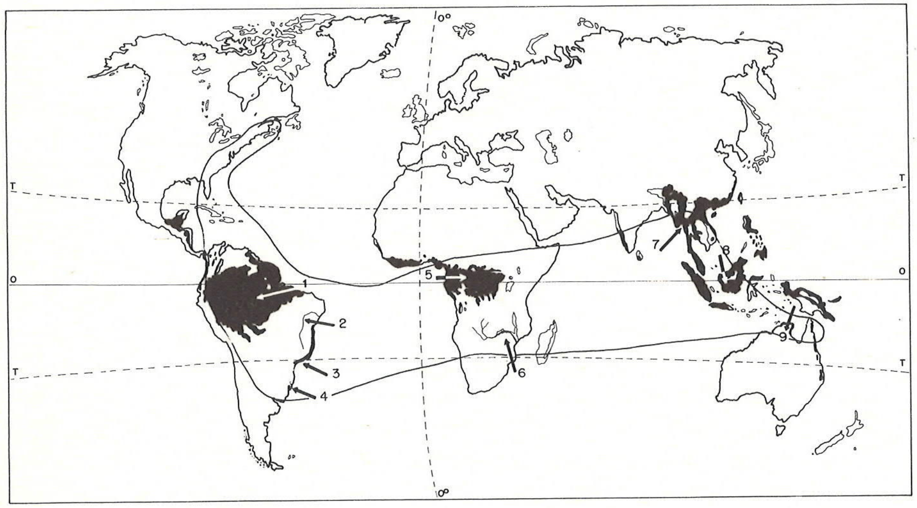

Fig. 2:
Distribution of the World's Tropical Rain Forests with arrows indicating areas of occurrence of the genus *Metania* GRAY, 1867. Areas from 1 to 4 after VOLKMER-RIBEIRO 1979, 1984; from 5 to 8 after PENNEY & RACEK 1968 and area 9 after STANISIC 1979. Continous line, first draft of the overall distribution of the new family Metaniidae.

Characteristics of generic value for *Metania*

The study of characteristics presented by sponges of the genus *Metania* allocated to the four Neotropical species, showed that the presence of a so-called "boletiform" gemmosclere (VOLKMER-RIBEIRO 1979, 1984) with a spiny, short shaft, bearing a collar of spines below the lower rotule, is a shared character. Such a characteristic is also recorded in the original descriptions of *Metania* species from the Oriental, Ethiopian, and Australian regions but is not present in other sponge genera.

Characteristics of specific value for the genus *Metania* in the Neotropical Region

Changes in shape of alfa and beta megascleres are specifically significant, as are the disposition and number of spines on the beta megascleres, on the microscleres and on the gemmosclere shaft. The shape of the upper knob and of the lower rotule of the gemmosclere also varies in the four species (VOLKMER-RIBEIRO 1979: figs. 1, 2; 1984: figs. 1, 2, 5).

The presence or absence of some kind of sclere may be of specific value, as in *M. spinata* which has a chaela series of microscleres, or as in *M. subtilis* where the beta megasclere is missing.

The skeletal structure is based on a reticulate model. Large meshes with primary and secondary net fibres are produced in *M. spinata* and *M. reticulata* (VOLKMER-RIBEIRO 1984; figs. 3, 6), there is a more diffuse network in *M. fittkaui* while a reticulum is completely absent in *M. subtilis* (VOLKMER-RIBEIRO 1979; figs. 4, 5). As can be seen from these figures, the skeletal structure is, on the other hand, linked to the hardness and size of the sponges. *M. reticulata*, which has the largest spicule fibres and the most conspicuous reticulate structure, produces the largest and hardest specimens. The reticulated skeletal structure decreases in significance from this type, from *M. fittkaui* to *M. spinata* and to *M. subtilis*, as do the texture and size of the specimens.

The presence of previously unreported characteristics in Neotropical *Metania* species rendered it imperative to redefine the genus in view of the redefinition presented by PENNEY & RACEK 1968.

Genus *Metania* GRAY, 1867, redefined

Metania GRAY, 1867, p. 551; LAUBENFELS, 1936, p. 36; BURTON, 1938, p. 463 (partim); JEWELL, 1952, p. 450; PENNEY, 1960, p. 45; LÈVI, 1965, p. 320; BRIEN, 1968, p. 399; PENNEY & RACEK, 1968, p. 147.

Tubella CARTER, 1881, p. 96 (partim); POTTS, 1887, p. 248 (partim); ANNANDALE, 1909, p. 102; 1911, p. 120; 1918, p. 213; GEE, 1933, p. 237 (partim); MACHADO, 1947, p. 2 (partim).

Acalle BURTON, 1934, p. 412; ARNDT, 1936, p. 17 (non GRAY, 1867, p. 552).

Potamolepis BURTON, 1938, p. 461 (non MARSHAL, 1883, p. 568).

Parametania BRIEN, 1968, p. 394.

Type species: *Spongilla reticulata* BOWERBANK, 1863.

Diagnosis: Sponges with boletiform gemmoscleres which have a spiny shaft and a collar of spines under the lower rotule.

Redefinition: Megascleres of two distinct classes, the alfa megascleres building the skeletal fibres and the beta megascleres producing gemmular cages or paweed around the gemmules. The second type may be absent. Alfa megascleres smooth, stout amphioxea to amphistrongyla. Beta megascleres spiny amphioxea to amphistrongyla usually about half the size of the other series. Both series show large size variation in a single specimen.

Microscleres of two distinct classes. Spiny minute amphioxea displaying large spines in the middle and a microgranulation at the extremities. The large spines have lanceolate endings. This type is always present and may be abundant or scarce, according to the specimen. Minute chaela may be present as a second type of microscleres, again with varying degrees of abundance.

Gemmoscleres boletiform and of varying lengths in the same gemmule. Shafts long to short, with a variable number of spines and a collar of spines under the lower rotule. Lower rotule large, stout, polygonal, with curved, undulated margins. Upper rotule knob-like, smooth or with a few recurved, irregularly placed spines or hooks, or approaching a true rotule with marginal incurved spines.

Gemmules abundant to extremely abundant, large, ovoid, cordiform or spherical, contained or not in capsules built of beta megascleres and scattered throughout the skeletal meshwork, or devoid of gemmular capsules and forming a basal stratum with a whitish mass of beta megascleres in the space between the gemmules. Thin pneumatic coat with large polygonal air spaces, in which the gemmoscleres are radially embedded with their boletiform rotule in the thick inner gemmular coat and the knoblike extremity projecting beyond the pneumatic coat. Two layers of gemmoscleres may be present. Outer gemmular coat ill-defined or absent. Foraminal tube short or long, larger towards the base, covered with slanting gemmoscleres with or without an outcurved collar at the extremity.

Sponges forming shallow, small, smooth, delicate, non reticulate to crumble-like reticulate crusts, or harder, hispid, reticulate bulbous growths with projecting tubercules.

Key to the Neotropical species of *Metania* (Fig. 3)

1. Sponges with two series of megascleres, one smooth and the other spiny and about half the size of the former 2
   Sponges with only smooth megascleres . . . . *M. subtilis*
2. Spiny megascleres with diffusely distributed spines along the whole sclere . . 3
   Spiny megascleres with spines localized at the middle of the sclere, the extremities smooth . . . . *M. spinata*
3. Gemmosclere shaft spiny to strongly spiny; the lower rotule with poorly developed borders . . . . *M. reticulata*
   Gemmosclere shaft extremely short, spines rare or absent; lower rotule with strongly developed borders, hiding part of the shaft . . . . *M. fittkaui*

Spicule and gemmule sizes of the four Neotropical species are given in Table 1.

Table 1: Sizes, in micrometres (minimum and maximum), of spicules and gemmules of the four Neotropical species of *Metania* GRAY, 1867. Corrections were introduced for some of the values presented in VOLKMER-RIBEIRO (1979 and 1984).

	Gemmulea	Alfa megascleres		Beta megascleres	
		Length range	Width range	Length range	Width range
M. reticulata	391 - 588	106 - 245	11 - 36	75 - 111	15 - 19
M. spinata	368 - 791	250 - 366	12 - 16	126 - 213	14 - 19
M. fittkaui	229 - 690	113 - 219	8 - 28	60 - 126	8 - 16
M. subtilis	413 - 776	216 - 381	8 - 43		

	Microscleres			Gemmoscleres		
	Oxeote		Chaelae			
	Length range	Width range	Length range	Length range	Width of shaft	Diameter of lower rotule
M. reticulata	43 - 103	3 - 10		22 - 38	2 - 6	16 - 20
M. spinata	50 - 116	4 - 8	16	27 - 41	3 - 6	15 - 23
M. fittkaui	43 - 90	3 - 5		15 - 25	3 - 5	15 - 21
M. subtilis	79 - 143	9 - 10		33 - 56	3 - 7	17 - 27

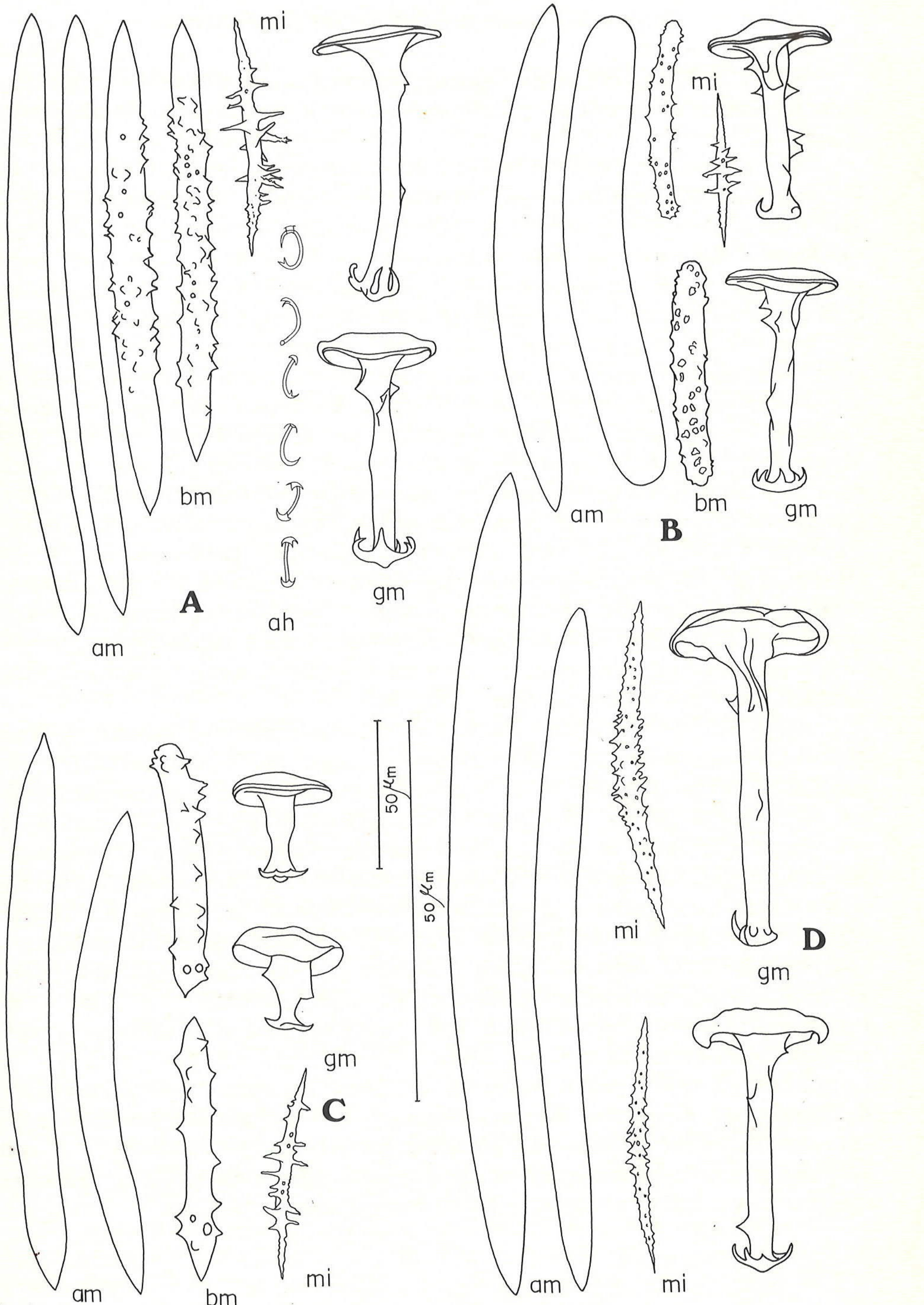

Fig. 3:
Alpha megascleres (am), beta megascleres (bm), microscleres (mi = anfioxea, an = chaelas) and gemmoscleres (gm) of: A) *Metania spinata* (CARTER, 1881), B) *Metania reticulata* (BOWERBANK, 1863), C) *Metania fittkaui* VOLKMER-RIBEIRO, 1979, D) *Metania subtilis* VOLKMER-RIBEIRO, 1979 (All gemmoscleres at high magnification).

Review of phyletic proposals for the genus *Metania*

PENNEY & RACEK (1968): 147 redefined the genus *Metania* on the basis of its "true tubelliform gemmoscleres", which they considered to be atypical birotulate gemmoscleres.

VOLKMER-RIBEIRO (1976) placed *Metania* phyletically between the genus *Heteromeyenia* POTTS, 1881, "sensu" PENNEY & RACEK, 1968 and *Drulia* GRAY, 1867 "sensu" PENNEY & RACEK, 1968. This proposition was supported by the author's agreement at that time with the widely accepted view that *Metania,* together with the other rotule bearing genera, stemmed from a *Spongilla-Radiospongilla* stock. The characteristics of *Heteromeyenia,* upon which VOLKMER-RIBEIRO (1976) established a close relationship with *Metania,* were the differing sizes of the gemmoscleres, the sparsely spined anfioxeous megascleres with their smooth extremities, the well developed pneumatic coat and the long foraminal tube with its terminal collar. The evolutionary sequence proposed for the Neotropical species of *Metania* would run from *M. subtilis* to *M. reticulata*, through *M. spinata* and *M. fittkaui.* In this way *Metania* species would have acquired a reticulate skeleton and a second class of megascleres. According to VOLKMER-RIBEIRO (1976) the genus *Drulia* originated from an ancestral *Metania* in Neotropical waters by the drastic reduction of shaft length, followed by loss of the upper knob. The genus *Drulia,* like *Metania,* is the only other to contain sponges with a very conspicuous reticulate skeleton with net primary and secondary fibres, individual gemmules contained in capsules composed of the second type of short, sparsely spined megascleres, microscleres amphioxea with larger central spines, megascleres which pass from amphioxea to stout amphistrongyla and large, stony hard bulbous sponges.

STANISIC (1979) put forth another hypothesis to explain the occurrence of a single *Metania* species in Australia. He followed the reasoning of PENNEY & RACEK (1968) and RACEK & HARRISON (1975) that birotulate gemmoscleres would have evolved from a *Radiospongilla* PENNEY & RACEK (op. cit.) stock in which the circle of spines at the gemmosclere extremities attained a rotular condition, considering the *Metania* gemmoscleres birotulate. STANISIC (1979) however resisted the idea that a monophyletic origin would explain the conspicuous morphological diversity of the birotulate genera. He also rejected the gemmosclere as a diagnostic character on which intergeneric relationships could be established, reporting work by POIRRIER (1974, 1975) and STANISIC (1977) where gemmosclere ecomorphies in *Ephydatia fluviatilis* (LINNAEUS, 1758) and *Radiospongilla sceptroides* (HASWELL, 1882) were considered so important as to mask ancestral characters and evolutionary gains.

STANISIC (1979) then turned to the variation in megasclere length in the genus *Radiospongilla* and proposed that two evolutionary lines diverged, at different times, from the same stock, represented by the *Radiospongilla cerebelata* (BOWERBANK, 1863) group. Such diverging lines could account for a polyphyletic origin of the birotulate freshwater sponges, the genus *Metania* having arisen from one of them in Australia.

A new phyletic position for the genus *Metania*

The gemmoscleres in *Metania* present such outstanding diversity compared to gemmoscleres in other genera of the family Spongillidae, that their use in the recognition of a group of the genus rank was largely accepted. However the gemmosclere was completely disregarded in STANISIC's (1979) proposal on generic relationships of *Metania,* or was under-valued because of assumptions that it represented an atypical birotulate (PENNEY & RACEK 1968) or a modification of a *Heteromeyenia* birotulate (VOLKMER-RIBEIRO 1976).

A slow process of evolution has long been recognized within the Porifera. LÈVI (1973) and BERGQUIST (1978), with supporting bibliography, comment that sponges are very conservative organisms. FINKS (1971) suggested a mosaic pattern of evolution for the Hindiidae, in which one structure changes while the rest of the organization remains stable. This evolutionary process would take place with widely separated saltation events and intervening long periods of stability, and would, in the whole, be very slow.

The recently proposed evidence from VOLKMER-RIBEIRO & DE ROSA-BARBOSA (1979) and VOLKMER-RIBEIRO & WATANABE (1983) confirm MARSHALL's (1883) and BRIAN's (1970) assumptions of a polyphyletic origin for freshwater sponges, and indicate that the polyphyly may be greater than previously thought. Demonstration by the former authors that some spicular components of marine sponges may occur, with little or no modification, in the freshwater branches of that stock offers the first evidence for the exclusion of convergent evolution from phylogenetic considerations on some freshwater sponges.

Such marine spicules, which have passed unchanged into the freshwater habitat, did so as gemmoscleres and, curiously enough, are given high value as diagnostic elements in the taxonomy of marine sponges. In *Sterrastrolepis brasiliensis* VOLKMER-RIBEIRO & DE ROSA-BARBOSA (1979) the gemmosclere is a sterraster, and other characteristics of the sponge also indicate an origin from a Hadromerid stock. In *Sanidastra yokotonensis* VOLKMER-RIBEIRO & WATANABE (1983) the gemmosclere reveals the transformation of a spinulated sanidaster into a peculiar new gemmosclere, while again, other characteristics indicate its evolution from Hadromerid stock.

The gemmular coat is thus the morphological structure which twice carried a "marine" character into freshwater habitat, in two largely independent geographical areas, Brazil and Japan, probably also in separate geological periods. The gemmosclere therefore emerges as a reliable character for phylogenetic studies and should, in any case, be carefully studied for its similarities to marine sponge spicules. A second step would be the search for other characteristics which strengthen overall similarity with the marine group, and allow the definite exclusion of convergent evolution.

The increasing evidence for a polyphyletic origin for freshwater sponges, allied to the peculiarity of the gemmosclere in *Metania* and its complex spicular set, necessited comparison between this genus and genera of Poecilosclerida.

The comparative study revealed striking similarity in the spicular components and skeletal structure in *Metania* GRAY, 1867 and *Acarnus* GRAY, 1867. The genus *Acarnus* is the only other with an "unequal birotulate", i. e. a smooth or acanthose cladotylote,

two or three kinds of "megascleres" and two kinds of microscleres, including a chaelate series. Sponges of the genus *Acarnus* have a characteristic reticulate skeleton with conspicuous ascending fibres and usually a hispid surface which may be ridged or furrowed. Quite hard sponges are also produced in *Acarnus.* Because this comparative study was carried out after the description of *Metania subtilis* and *Metania fittkaui* but before submission of the redescription of *M. reticulata* and *M. spinata* for publication the four species were again revised, in view of the spicular set of *Acarnus,* to search for possibly unnoted spicular components. The chaelate series of microscleres in *M. spinata* was at that stage detected and included in the redescription of the species (VOLKMER-RIBEIRO 1984).

Metania spinata appears to be the most primitive species of the genus in the Neotropical Region, being the only one which has retained the chaelate series of microscleres and the basal lokalization of the ancanthose megascleres. The primary ascending fibres of the reticulate skeleton are also conspicuous. *M. spinata* also has quite long gemmoscleres (Table 1), in which the upper knob is very similar to that seen in *Acarnus* cladotylotes, while the lower rotule is not as developed as in the other three species.

The assumption that *Metania* diverged from the marine stock which also gave rise to the genus *Acarnus* allows the recognition of a group of freshwater sponges which show affinities with either *Metania* or *Acarnus.* Such sponges belong in the genera *Corvomeyenia* WELTNER, 1913 "sensu" HARRISON, 1971, *Acalle* GRAY, 1867 "sensu" VOLKMER-RIBEIRO & DE ROSA-BARBOSA, 1972 and *Drulia* GRAY, 1867 "sensu" MOTHES DE MORAES, 1983. *Corvomeyenia, Acalle* and *Metania* seem to be closer to *Acarnus* while *Drulia* is phyletically closer to *Metania.*

In *Corvomeyenia* the whole gemmoscIere was remained very similar to the smooth cladotylote in *Acarnus.* An extensive study of the gemmoscleres in *C. everetti* (MILLS, 1884) produced a series which grades from slightly transformed smooth cladotylotes to the "birotulate" gemmoscleres described for this genus (Fig. 4). The birotular condition of the gemmosclere in *Corvomeyenia* was attained by convergent evolution, when double (birotulata) silicious sealing of the gemmular coat was selected for, rather than a single one. The acanthose cladotylotes can be recognized as one microsclere series and are present in the three species of the genus, i. e. *C. everetti* (MILLS, 1884), *C. australis* BONETTO & EZCURRA DE DRAGO, 1966 and *C. carolinensis* HARRISON, 1971. The chaelate, second series of megascleres, is missing in *C. everetti* only. The spiny series of megascleres, which corresponds to the acanthostyles in *Acarnus*, or to the beta megascleres in *Metania,* is missing in *Corvomeyenia.*

Acalle is the only genus mentioned which is monotypic and has two series of gemmoscleres. In *A. recurvata* (BOWERBANK, 1863) the inner series must have been drived from a smooth cladotylote: the cladiform extremity evolved into a rotule when a siliceous web extended among the rays, as in *Metania.* The outer gemmosclere series quite probably originated from a acanthocladotylote. Two kinds of megascleres are also present in *Acalle* and both have small spines at the extremities, the acanthose megascleres line the excurrent canals in the basal portion of *A. recurvata,* the two series of microscleres are lacking but the skeletal structure retains the main ascending fibres (VOLKMER-RIBEIRO & DE ROSA-BARBOSA 1972).

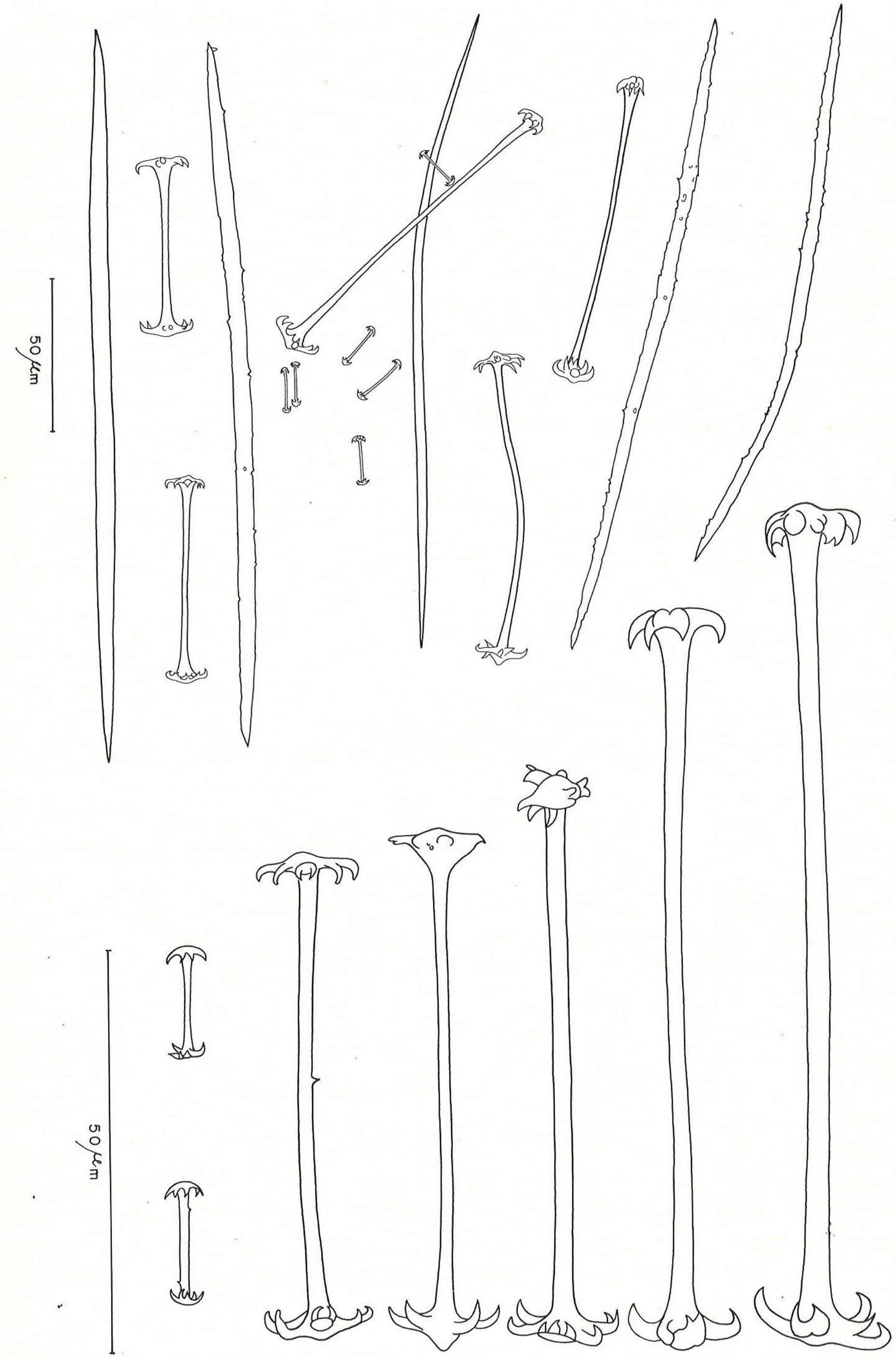

Fig. 4:
Spicular components of *Corvomeyenia everetti* (MILLS, 1884). N. Gist Gee no. 54 055, USA. Above gemmoscleres and microscleres at high magnification. Below the entire spicular set of *C. everetti* at lower magnification.

The frequently advanced hypothesis of a hybrid origin for some freshwater sponge species which have an "abnormal" second series of gemmoscleres (PENNEY & RACEK 1968; VOLKMER-RIBEIRO 1976a), including *A. recurvata,* now requires careful revision, in the search for an ancestral with a complex spicular set. What emerges from the present study is that *Metania* inherited a larger part of an ancestral spicular set like that of *Acarnus,* whilst *Corvomeyenia, Acalle* and *Drulia* inherited smaller parts.

The genus *Drulia* seems to be at the end of an evolutionary series in which the length of the shaft, and the knobbed extremity of the *Acarnus* cladotylote were gradually reduced (Fig. 5). This reduction started with *Corvomeyenia,* followed by *Metania* and *Acalle,* to reach *Drulia* where the shaft is reduced to a spine, which may bear a vestigial knobbed extremity, as in *Drulia cristata* (WELTNER, 1895). Spiny megascleres occur in *Drulia* and *Metania* and are used to build up the gemmular cages. The microscleres are reduced to the spiny oxeote series, which, in *D. browni* (BOWERBANK, 1863), shows characteristics of an ancestral short acanthocladotylote (MOTHES DE MORAES 1983, fig. 3 and 8).

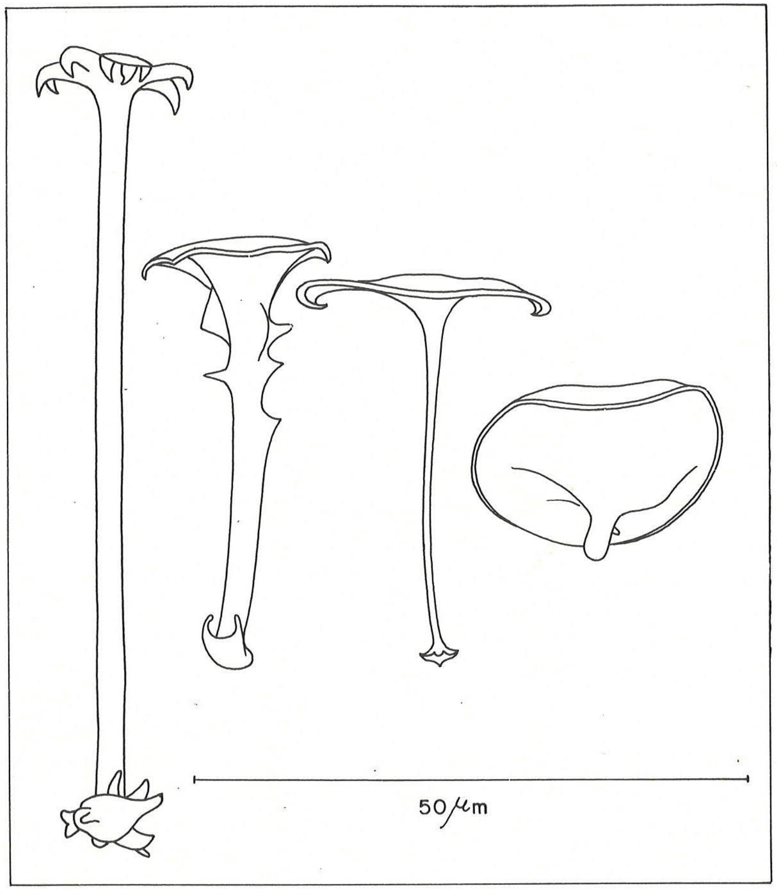

Fig. 5:
Gemmoscleres of, from left to right: *Corvomeyenia everetti* (MILLS, 1884), *Metania spinata* (CARTER, 1881), *Acalle recurvata* (BOWERBANK, 1863), and *Drulia browni* (BOWERBANK, 1863) (High magnification). The second class of gemmoscleres in *A. recurvata* is not represented since it belongs to the evolutionary sequence of another character.

Overall comparison of the four genera shows that *Drulia* is closer to *Metania* on account of its reticulate skeleton with very conspicuous primary and secondary fibres, beta megascleres and gemmular cages, its amphioxeote series of microscleres and the production of large, hard, bulbous growths.

An entirely new evolutionary sequence is now envisaged for the genus *Metania* in the Neotropical Region.

The study of the specific characteristics within Neotropical *Metania* species indicates that evolution from an ancestral stock, in common with *Acarnus,* would have operated by reduction of the spicular classes as well as modification of the spicular shape and size. The evolutionary sequence in the Neotropical Region would thus start with *M. spinata* and end with *M. subtilis,* which shows the most drastic reduction of the generic characteristics.

The evidence that a group of marine sponges has further evolved in freshwater as well as in marine habitats permits, for the first time, comparative study of sponge evolution in freshwater and marine environments. It further recommends that the genera *Metania, Corvomeyenia, Acalle* and *Drulia* be removed from the family Spongillidae and placed in a new family of freshwater sponges.

The genus *Metania* is selected as the type genus of the new family because of its wide distribution (Fig. 2). *Corvomeyenia* has a Nearctic and Neotropical distribution whilst *Acalle* and *Drulia* are exclusively Neotropical. The new family is defined as follows:

Phylum Porifera
Order Poecilosclerida
Metaniidae, new family

Definition:
Poecilosclerid freshwater sponges with modified cladotylotes as gemmoscleres.

Type Genus:
Metania GRAY, 1867, as presently redefined.

In addition to *Metania* the new family includes the genera *Corvomeyenia* WELTNER, 1913 "sensu" HARISON, 1971, *Acalle* GRAY, 1867 "sensu" VOLKMER-RIBEIRO & DE ROSA-BARBOSA, 1972 and *Drulia* GRAY, 1867 "sensu" MOTHES DE MORAES, 1983.

In view of the short definition proposed by TOPSENT (1928) for the family Acarnidae, it is apparent that this family requires revision beginning with a fresh study of the several species recently described in *Acarnus* and *Acanthacarnus* LÈVI, 1962 (LÈVI erected the genus *Acanthacarnus* to include those species of *Acarnus* with acanthostyles). It seems quite probably that the family Acarnidae will be monotypic, containing only the genus *Acarnus,* but even if that is be, the family must be retained within the marine sponges, an opinion apparently shared, among other authors, by BOURY-ESNAULT (1973). The pattern of evolution within the new family Mataniidae may suggest the evolutionary spectrum which could be expected within the Acarnidae.

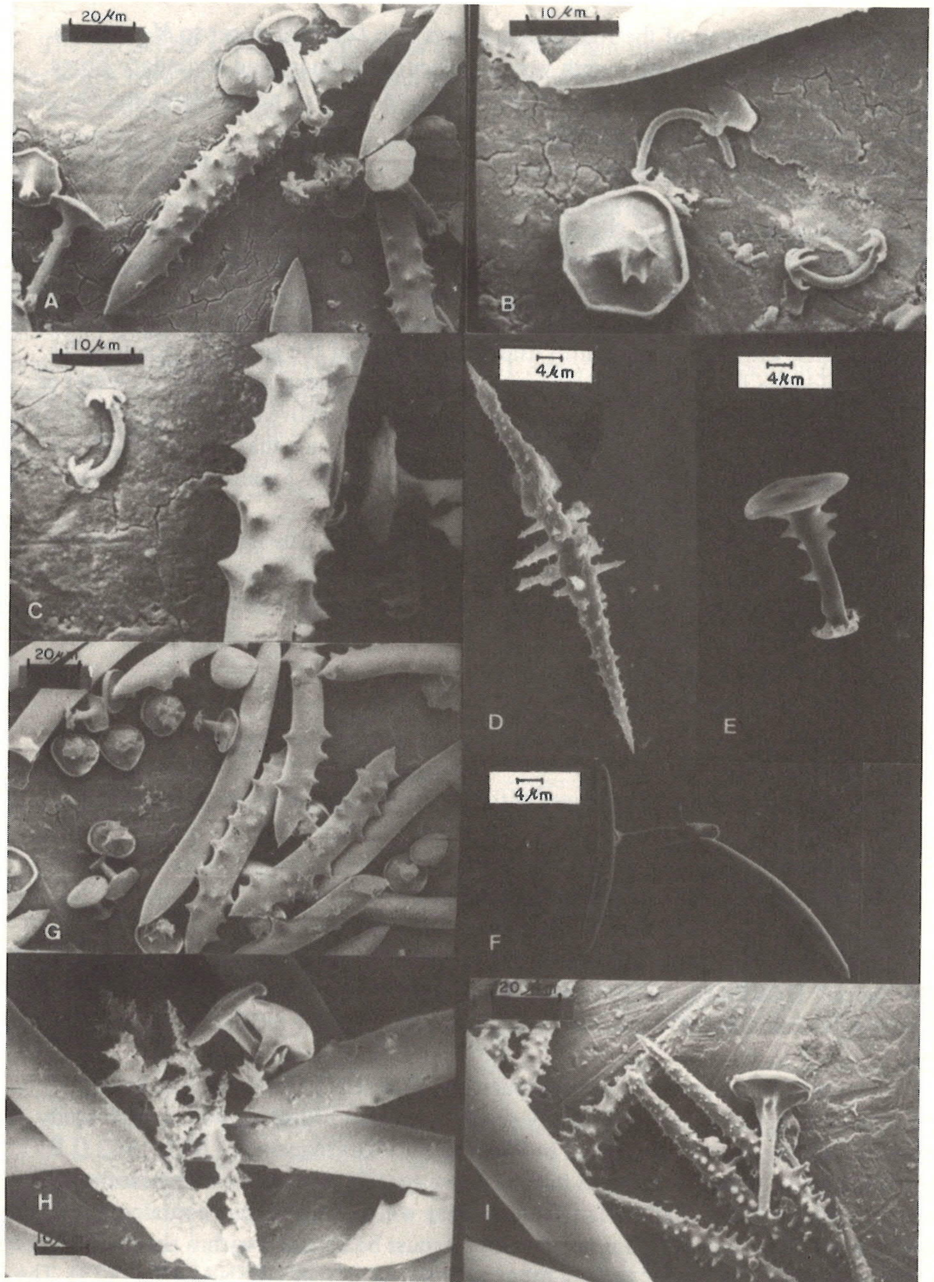

Fig. 6:
SEM photos of spicules of the Neotropical species of genus *Metania:*
A = beta megascleres and gemmoscleres of *M. spinata* (CARTER, 1881); B = chaelate microscleres and upper view of gemmosclere of *M. spinata;* C = chaelate microsclere, central part of beta megasclere, lower and upper rotules of gemmoscleres of *M. spinata;* D = microsclere of *M. reticulata* (BOWERBANK, 1863); E = gemmosclere of *M. reticulata;* F = alpha and beta megascleres of *M. reticulata;* G = alpha megascleres, beta megascleres and gemmoscleres of *M. fittkaui* VOLKMER-RIBEIRO, 1979; H = alpha megascleres, points of two beta megascleres and microscleres of *M. fittkaui;* I = megascleres, microscleres and gemmoscleres of *M. subtilis* VOLKMER-RIBEIRO, 1979.

Summary

The gondwanic freshwater sponge genus *Metania* GRAY, 1867 is redefined after a through revision of its four Neotropical species. New characteristics were detected which suggested the retention or slow modification of characteristics of a marine stock, related to the genus *Acarnus* GRAY, 1867 of Poecilosclerid sponges. Those "persistant" characteristics could be also perceived in the freshwater genera *Corvomeyenia* WELTNER, 1913, *Acalle* GRAY, 1867, and *Drulia* GRAY, 1867. *Metania, Corvomeyenia, Acalle,* and *Drulia* are transferred from the family Spongillidae GRAY, 1867 into a new family, the Metaniidae, after a first analysis of their shared characteristics.

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